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BARR

March 16, 2012

Mr. Jason Gunter
Remedial Project Manager
U.S. Environmental Protection Agency
Region 7 - Superfund Branch
901 North 5th Street
Kansas City, KS 66101

Re: The Doe Run Company – Elvins/Rivermines Mine Tailings Site Monthly Progress Report

Dear Mr. Gunter:

As required by Article VI, Section 56 of the Unilateral Administrative Order (UAO) (CERCLA-07-2005-0169) for the referenced project and on behalf of The Doe Run Company, the progress report for the period January 1, 2012 through January 31, 2012 is enclosed. If you have any questions or comments, please call me at 573-638-5020 or Mark Nations at 573-518-0800.

Sincerely,

Ty L. Morris, P.E., R.G.
Vice President

TLM/jms
Enclosures
c: Mark Nations – TDRC
Matt Wohl – TDRC (electronic only)
Kathy Rangen – MDNR
Tim Skoglund – Barr Engineering

Elvins/Rivermines Mine Tailings Site
Park Hills, Missouri
Removal Action - Monthly Progress Report
Period: January 1, 2012 – January 31, 2012

1. **Actions Performed and Problems Encountered This Period:**

   a. Pilot treatment system testing continued with clogging of the iron/sand media persisting in January, despite efforts the previous month to remedy the issue. Clogging of the iron/sand filter is believed to be occurring primarily due to transfer of gases (CO_2 and/or oxygen) at the upper portion of the ZVI/sand filter. This gas transfer may result in precipitation of iron oxides and/or carbonates in the upper portion of the filter, restricting flow. During the month of January, flow rates continued to decline and careful monitoring of physical and analytical parameters at different components of the pilot treatment system occurred. An acid treatment using a combination of citric and muriatic acids is planned for early February to attempt to reduce the amount of clogging.

   b. The flow rate through the system was adjusted according to the flow rate exiting the zero valent iron (ZVI)/sand filter. This caused the roughing filter to overtop a small amount, but maintained a consistent amount of head acting to push water through the ZVI/sand filter. This allowed for the observation of how quickly the clogging was occurring.

   c. It was discovered in January that the limestone gravel contained in the pilot treatment system is contributing dissolved iron to the system. This was most noticeable in the roughing filter where iron concentrations increased from non-detect in the system influent to over 3.0 mg/L in the roughing filter effluent. It is suspected dissolved iron is being added in the aeration tank due to the presence of limestone as well. Due do the fairly recent addition of a stand pipe in the aeration chamber, much of this iron is being allowed to settle out in the form of iron oxide.

   d. Analytical results and physical observations of final sand filter indicates that the final sand filter is likely saturated with solids from the pilot treatment system and currently capturing few, if any, additional particles. Due to the renovations done to the aeration tank, many solids are settling out before reaching the final sand filter, which is shown by a decrease in total metals concentrations between the ZVI/sand filter effluent and the final system effluent.

   e. Analytical sampling and field measurements continued two to three times a week for the duration of the month of January. An acute WET test was performed using a sample pulled from the system effluent on January 24, 2012.

2. **Analytical Data and Results Received This Period:**

   a. The removal percentage for dissolved zinc in the effluent was generally found to exceed 98.0% between January 4, 2012 and January 13, 2012. This equated to dissolved zinc levels that ranged between 157 µg/L and 318 µg/L.

   b. The removal percentage for total zinc in the effluent was found to range between 93.4% and 98.6% between January 4, 2012 and January 13, 2012. This equated to total zinc levels that ranged between 281 µg/L and 1.50 mg/L.

   c. Iron concentrations in the system effluent between January 4, 2012 and January 13, 2012 ranged from 1.07 mg/L to 11.55 mg/L.

   d. Total suspended solids concentrations in the system effluent between January 4, 2012 and January 13, 2012 ranged from 9 mg/L to 56 mg/L.

   e. Acute WET testing was performed using samples pulled from the system effluent on January 24, 2012. At the time this report was written, results had not been received.

f. During this period, water samples were collected from just upstream of Old Missouri Highway 32, as well as from upstream and downstream of the confluence of the site discharge with Flat River. The analytical results for this event are included in this progress report.

g. During this period, the Ambient Air Monitoring Report for November 2011 and December 2011 were received. Any issues identified in these reports are discussed below. A copy of these documents has been sent to your attention.

The November 2011 Ambient Air Monitoring Report noted the following:

- The action levels for lead and dust were not exceeded.
- No samples were taken with the TSP and PM_{10} monitors on 11/14/11 due to training.
- No samples were taken with the TSP and PM_{10} monitors on 11/23/11, 11/24/11, 11/25/11, and 11/26/11 due to the holiday.

The December 2011 Ambient Air Monitoring Report noted the following:

- The action levels for lead and dust were not exceeded.
- No samples were taken with the Big River #4 QA TSP monitor on 12/20/11 due to mechanical failure. Upon discovery, the issue was corrected.
- There was a QA blank filter associated with the Rivermines #1 (Office) TSP monitors and PM_{10} on 12/28/11.
- No samples were taken with the TSP and PM_{10} monitors on 12/22/11, 12/23/11, 12/26/11, 12/29/11, and 12/30/11 due to the holiday.

3. Developments Anticipated and Work Scheduled for Next Period:

a. Continue analytical samples and field measurements three times a week.

b. Perform any maintenance or adjustments to the pilot test system that may be needed. It is anticipated that this work will likely focus on the ZVI/sand filter if the clogging issues continue.

c. Complete monthly water sampling activities as described in the Removal Action Work Plan.

d. Complete air monitoring activities as described in the Removal Action Work Plan.

4. Changes in Personnel:

a. None.

5. Issues or Problems Arising This Period:

a. None.

6. Resolution of Issues or Problems Arising This Period:

a. None.

End of Monthly Progress Report

February 01, 2012

Allison Olds
Barr Engineering Company
1001 Diamond Ridge
Suite 1100
Jefferson City, MO 65109
TEL: (573) 638-5007
FAX: (573) 638-5001

RE: Rivermines MS-25/86-0009 **WorkOrder:** 12010902

Dear Allison Olds:

TEKLAB, INC received 4 samples on 1/25/2012 10:41:00 AM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Michael L. Austin
Project Manager
(618)344-1004 ex 16
MAustin@teklabinc.com

Client: Barr Engineering Company
Client Project: Rivermines MS-25/86-0009

Work Order: 12010902
Report Date: 01-Feb-12

This reporting package includes the following:

Client: Barr Engineering Company
Work Order: 12010902
Client Project: Rivermines MS-25/86-0009
Report Date: 01-Feb-12

Abbr Definition

CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilutions factors.
DNI	Did not ignite
DUP	Laboratory duplicate is an aliquot of a sample taken from the same container under laboratory conditions for independent processing and analysis independently of the original aliquot.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample, spiked with verified known amounts of analytes, is analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. The acceptable recovery range is in the QC Package (provided upon request).
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MB	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	Method detection limit means the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions. The acceptable recovery range is listed in the QC Package (provided upon request).
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

# - Unknown hydrocarbon	B - Analyte detected in associated Method Blank
E - Value above quantitation range	H - Holding times exceeded
M - Manual Integration used to determine area response	ND - Not Detected at the Reporting Limit
R - RPD outside accepted recovery limits	S - Spike Recovery outside recovery limits
X - Value exceeds Maximum Contaminant Level	

Client: Barr Engineering Company
Client Project: Rivermines MS-25/86-0009

Work Order: 12010902
Report Date: 01-Feb-12

Cooler Receipt Temp: 3.2 °C

Locations and Accreditations

Collinsville		Springfield		Kansas City	
Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425	Address	3920 Pintail Dr Springfield, IL 62711-9415	Address	8421 Nieman Road Lenexa, KS 66214
Phone	(618) 344-1004	Phone	(217) 698-1004	Phone	(913) 541-1998
Fax	(618) 344-1005	Fax	(217) 698-1005	Fax	(913) 541-1998
Email	jhriley@teklabinc.com	Email	kmcclain@teklabinc.com	Email	dthompson@teklabinc.com

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2013	Collinsville
Kansas	KDHE	E-10374	NELAP	1/31/2013	Collinsville
Louisiana	LDEQ	166493	NELAP	6/30/2012	Collinsville
Louisiana	LDEQ	166578	NELAP	6/30/2012	Springfield
Arkansas	ADEQ	88-0966		3/14/2012	Collinsville
Illinois	IDPH	17584		4/30/2012	Collinsville
Kentucky	UST	0073		5/26/2012	Collinsville
Missouri	MDNR	00930		4/13/2013	Collinsville
Oklahoma	ODEQ	9978		8/31/2012	Collinsville

Client: Barr Engineering Company
Work Order: 12010902
Client Project: Rivermines MS-25/86-0009
Report Date: 01-Feb-12
Lab ID: 12010902-001
Client Sample ID: RM-001
Matrix: AQUEOUS
Collection Date: 01/24/2012 10:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	375		**969**	mg/L	5	01/27/2012 19:47	R159326
STANDARD METHOD 18TH ED. 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		**7.68**		1	01/26/2012 14:02	R159192
STANDARD METHODS 18TH ED. 2340 C								
Hardness, as (CaCO3)	NELAP	5		**1200**	mg/L	1	01/25/2012 14:50	R159170
STANDARD METHODS 18TH ED. 2540 D								
Total Suspended Solids	NELAP	6		**< 6**	mg/L	1	01/27/2012 9:18	R159247
STANDARD METHODS 18TH ED. 2540 F								
Solids, Settleable	NELAP	0.1		**< 0.1**	ml/L	1	01/25/2012 12:53	R159156
STANDARD METHODS 18TH ED. 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	1.0		**< 1.0**	mg/L	1	01/26/2012 18:03	R159214
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	2.00		**16.1**	µg/L	1	01/27/2012 15:57	74624
Zinc	NELAP	10.0		**13100**	µg/L	1	01/26/2012 22:26	74624
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	2.00		**17.2**	µg/L	1	01/26/2012 12:30	74597
Zinc	NELAP	10.0	S	**16000**	µg/L	1	01/26/2012 12:30	74597
Zn-Sample concentration was greater than 5 times the spike concentration.								
STANDARD METHODS 18TH ED. 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	2.00	X	**15.8**	µg/L	1	01/27/2012 9:22	74611
STANDARD METHODS 18TH ED. 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	2.00	X	**16.0**	µg/L	1	01/26/2012 8:48	74600

Client: Barr Engineering Company
Work Order: 12010902
Client Project: Rivermines MS-25/86-0009
Report Date: 01-Feb-12
Lab ID: 12010902-002
Client Sample ID: RM-Dup
Matrix: AQUEOUS
Collection Date: 01/24/2012 13:15

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	100		**111**	mg/L	10	01/30/2012 20:00	R159331
STANDARD METHOD 18TH ED. 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		**8.14**		1	01/26/2012 14:04	R159192
STANDARD METHODS 18TH ED. 2340 C								
Hardness, as (CaCO3)	NELAP	5		**320**	mg/L	1	01/25/2012 14:50	R159170
STANDARD METHODS 18TH ED. 2540 D								
Total Suspended Solids	NELAP	6		**< 6**	mg/L	1	01/27/2012 9:18	R159247
STANDARD METHODS 18TH ED. 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	1.0		**1.7**	mg/L	1	01/26/2012 18:09	R159214
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	2.00		**< 2.00**	µg/L	1	01/27/2012 16:03	74624
Zinc	NELAP	10.0		**966**	µg/L	1	01/27/2012 16:03	74624
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	2.00		**< 2.00**	µg/L	1	01/26/2012 12:46	74597
Zinc	NELAP	10.0		**1010**	µg/L	1	01/26/2012 12:46	74597
STANDARD METHODS 18TH ED. 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	2.00		**< 2.00**	µg/L	1	01/26/2012 15:25	74611
STANDARD METHODS 18TH ED. 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	2.00		**< 2.00**	µg/L	1	01/26/2012 8:52	74600

Client: Barr Engineering Company
Work Order: 12010902
Client Project: Rivermines MS-25/86-0009
Report Date: 01-Feb-12
Lab ID: 12010902-003
Client Sample ID: RM-DS
Matrix: AQUEOUS
Collection Date: 01/24/2012 13:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	75		**111**	mg/L	1	01/27/2012 19:53	R159326
STANDARD METHOD 18TH ED. 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		**8.18**		1	01/26/2012 14:06	R159192
STANDARD METHODS 18TH ED. 2340 C								
Hardness, as (CaCO3)	NELAP	5		**280**	mg/L	1	01/25/2012 14:50	R159170
STANDARD METHODS 18TH ED. 2540 D								
Total Suspended Solids	NELAP	6		**< 6**	mg/L	1	01/27/2012 9:18	R159247
STANDARD METHODS 18TH ED. 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	1.0		**1.8**	mg/L	1	01/26/2012 18:15	R159214
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	2.00		**< 2.00**	µg/L	1	01/27/2012 16:08	74624
Zinc	NELAP	10.0		**819**	µg/L	1	01/26/2012 22:38	74624
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	2.00		**< 2.00**	µg/L	1	01/26/2012 12:52	74597
Zinc	NELAP	10.0		**1010**	µg/L	1	01/26/2012 12:52	74597
STANDARD METHODS 18TH ED. 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	2.00		**< 2.00**	µg/L	1	01/26/2012 15:29	74611
STANDARD METHODS 18TH ED. 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	2.00		**< 2.00**	µg/L	1	01/26/2012 9:02	74600

Client: Barr Engineering Company
Work Order: 12010902
Client Project: Rivermines MS-25/86-0009
Report Date: 01-Feb-12
Lab ID: 12010902-004
Client Sample ID: RM-US
Matrix: AQUEOUS
Collection Date: 01/24/2012 11:05

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	20		**32**	mg/L	2	01/30/2012 20:02	R159331
STANDARD METHOD 18TH ED. 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		**8.27**		1	01/26/2012 14:08	R159192
STANDARD METHODS 18TH ED. 2340 C								
Hardness, as (CaCO3)	NELAP	5		**220**	mg/L	1	01/25/2012 14:50	R159170
STANDARD METHODS 18TH ED. 2540 D								
Total Suspended Solids	NELAP	6		**< 6**	mg/L	1	01/27/2012 9:32	R159247
STANDARD METHODS 18TH ED. 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	1.0		**2.0**	mg/L	1	01/26/2012 18:21	R159214
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	2.00		**< 2.00**	µg/L	1	01/27/2012 16:14	74624
Zinc	NELAP	10.0		**< 10.0**	µg/L	1	01/26/2012 22:43	74624
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	2.00		**< 2.00**	µg/L	1	01/26/2012 13:08	74597
Zinc	NELAP	10.0		**< 10.0**	µg/L	1	01/26/2012 13:08	74597
STANDARD METHODS 18TH ED. 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	2.00		**< 2.00**	µg/L	1	01/26/2012 15:32	74611
STANDARD METHODS 18TH ED. 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	2.00		**< 2.00**	µg/L	1	01/26/2012 9:05	74600

Client: Barr Engineering Company
Client Project: Rivermines MS-25/86-0009

Work Order: 12010902
Report Date: 01-Feb-12

Lab Sample ID	Client Sample ID	Matrix	Fractions	Collection Date
12010902-001	RM-001	Aqueous	5	01/24/2012 10:30
12010902-002	RM-Dup	Aqueous	5	01/24/2012 13:15
12010902-003	RM-DS	Aqueous	5	01/24/2012 13:00
12010902-004	RM-US	Aqueous	5	01/24/2012 11:05

Client: Barr Engineering Company
Client Project: Rivermines MS-25/86-0009

Work Order: 12010902
Report Date: 01-Feb-12

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date / Prep Date/Time	Analysis Date/Time
12010902-001A	RM-001	01/24/2012 10:30	1/25/2012 10:41:00 AM	
	Standard Methods 18th Ed. 2540 F			01/25/2012 12:53
12010902-001B	RM-001	01/24/2012 10:30	1/25/2012 10:41:00 AM	
	EPA 600 375.2 Rev 2.0 1993 (Total)			01/27/2012 19:47
	Standard Method 18th Ed. 4500-H B, Laboratory Analyzed			01/26/2012 14:02
	Standard Methods 18th Ed. 2340 C			01/25/2012 14:50
	Standard Methods 18th Ed. 2540 D			01/27/2012 9:18
12010902-001C	RM-001	01/24/2012 10:30	1/25/2012 10:41:00 AM	
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)		01/25/2012 14:25	01/26/2012 12:30
	Standard Methods 18th Ed. 3030 E, 3113 B, Metals by GFAA		01/25/2012 15:37	01/26/2012 8:48
12010902-001D	RM-001	01/24/2012 10:30	1/25/2012 10:41:00 AM	
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)		01/26/2012 10:54	01/26/2012 22:26
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)		01/26/2012 10:54	01/27/2012 15:57
	Standard Methods 18th Ed. 3030 B, 3113 B, Metals by GFAA (Dissolved)		01/26/2012 7:53	01/27/2012 9:22
12010902-001E	RM-001	01/24/2012 10:30	1/25/2012 10:41:00 AM	
	Standard Methods 18th Ed. 5310 C, Organic Carbon			01/26/2012 18:03
12010902-002B	RM-Dup	01/24/2012 13:15	1/25/2012 10:41:00 AM	
	EPA 600 375.2 Rev 2.0 1993 (Total)			01/30/2012 20:00
	Standard Method 18th Ed. 4500-H B, Laboratory Analyzed			01/26/2012 14:04
	Standard Methods 18th Ed. 2340 C			01/25/2012 14:50
	Standard Methods 18th Ed. 2540 D			01/27/2012 9:18
12010902-002C	RM-Dup	01/24/2012 13:15	1/25/2012 10:41:00 AM	
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)		01/25/2012 14:25	01/26/2012 12:46
	Standard Methods 18th Ed. 3030 E, 3113 B, Metals by GFAA		01/25/2012 15:37	01/26/2012 8:52
12010902-002D	RM-Dup	01/24/2012 13:15	1/25/2012 10:41:00 AM	
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)		01/26/2012 10:54	01/27/2012 16:03
	Standard Methods 18th Ed. 3030 B, 3113 B, Metals by GFAA (Dissolved)		01/26/2012 7:53	01/26/2012 15:25
12010902-002E	RM-Dup	01/24/2012 13:15	1/25/2012 10:41:00 AM	
	Standard Methods 18th Ed. 5310 C, Organic Carbon			01/26/2012 18:09
12010902-003A	RM-DS	01/24/2012 13:00	1/25/2012 10:41:00 AM	
	Standard Method 18th Ed. 4500-H B, Laboratory Analyzed			01/26/2012 14:06
	Standard Methods 18th Ed. 2540 D			01/27/2012 9:18
12010902-003B	RM-DS	01/24/2012 13:00	1/25/2012 10:41:00 AM	
	EPA 600 375.2 Rev 2.0 1993 (Total)			01/27/2012 19:53
	Standard Methods 18th Ed. 2340 C			01/25/2012 14:50
12010902-003C	RM-DS	01/24/2012 13:00	1/25/2012 10:41:00 AM	

Client: Barr Engineering Company
Client Project: Rivermines MS-25/86-0009

Work Order: 12010902
Report Date: 01-Feb-12

Sample ID	Client Sample ID	Collection Date	Received Date	
	Test Name		Prep Date/Time	Analysis Date/Time
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)		01/25/2012 14:25	01/26/2012 12:52
	Standard Methods 18th Ed. 3030 E, 3113 B, Metals by GFAA		01/25/2012 15:37	01/26/2012 9:02
12010902-003D	RM-DS	01/24/2012 13:00	1/25/2012 10:41:00 AM	
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)		01/26/2012 10:54	01/26/2012 22:38
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)		01/26/2012 10:54	01/27/2012 16:08
	Standard Methods 18th Ed. 3030 B, 3113 B, Metals by GFAA (Dissolved)		01/26/2012 7:53	01/26/2012 15:29
12010902-003E	RM-DS	01/24/2012 13:00	1/25/2012 10:41:00 AM	
	Standard Methods 18th Ed. 5310 C, Organic Carbon			01/26/2012 18:15
12010902-004A	RM-US	01/24/2012 11:05	1/25/2012 10:41:00 AM	
	Standard Method 18th Ed. 4500-H B, Laboratory Analyzed			01/26/2012 14:08
	Standard Methods 18th Ed. 2540 D			01/27/2012 9:32
12010902-004B	RM-US	01/24/2012 11:05	1/25/2012 10:41:00 AM	
	EPA 600 375.2 Rev 2.0 1993 (Total)			01/30/2012 20:02
	Standard Methods 18th Ed. 2340 C			01/25/2012 14:50
12010902-004C	RM-US	01/24/2012 11:05	1/25/2012 10:41:00 AM	
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)		01/25/2012 14:25	01/26/2012 13:08
	Standard Methods 18th Ed. 3030 E, 3113 B, Metals by GFAA		01/25/2012 15:37	01/26/2012 9:05
12010902-004D	RM-US	01/24/2012 11:05	1/25/2012 10:41:00 AM	
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)		01/26/2012 10:54	01/26/2012 22:43
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)		01/26/2012 10:54	01/27/2012 16:14
	Standard Methods 18th Ed. 3030 B, 3113 B, Metals by GFAA (Dissolved)		01/26/2012 7:53	01/26/2012 15:32
12010902-004E	RM-US	01/24/2012 11:05	1/25/2012 10:41:00 AM	
	Standard Methods 18th Ed. 5310 C, Organic Carbon			01/26/2012 18:21

Client: Barr Engineering Company

Client Project: Rivermines MS-25/86-0009

Work Order: 12010902

Report Date: 01-Feb-12

EPA 600 375.2 REV 2.0 1993 (TOTAL)

Batch R159326 **SampType:** MBLK Units mg/L
SampID: ICB/MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	75		< 75						01/27/2012

Batch R159326 **SampType:** MBLK Units mg/L
SampID: MBLK DI

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	75		< 75						01/27/2012

Batch R159326 **SampType:** LCS Units mg/L
SampID: ICV/LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	75		146	150	0	97.4	90	110	01/27/2012

Batch R159331 **SampType:** MBLK Units mg/L
SampID: ICB/MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		< 10						01/30/2012

Batch R159331 **SampType:** LCS Units mg/L
SampID: ICV/LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		19	20	0	97.4	90	110	01/30/2012

Batch R159331 **SampType:** MS Units mg/L
SampID: 12010902-004B MS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	20		51	20	31.86	93.6	85	115	01/30/2012

Batch R159331 **SampType:** MSD Units mg/L RPD Limit 10
SampID: 12010902-004B MSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate	20		51	20	31.86	96.3	50.57	1.08	01/30/2012

STANDARD METHOD 18TH ED. 4500-H B, LABORATORY ANALYZED

Batch R159192 **SampType:** LCS Units
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lab pH	1.00		7.02	7.00	0	100.3	99.1	100.8	01/26/2012

Client: Barr Engineering Company

Client Project: Rivermines MS-25/86-0009

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STANDARD METHOD 18TH ED. 4500-H B, LABORATORY ANALYZED

Batch R159192 **SampType:** DUP Units RPD Limit 10

SampID: 12010902-001BDUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH	1.00		**7.69**				7.680	0.13	01/26/2012

Batch R159192 **SampType:** DUP Units RPD Limit 10

SampID: 12010902-002BDUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH	1.00		**8.14**				8.140	0.00	01/26/2012

Batch R159192 **SampType:** DUP Units RPD Limit 10

SampID: 12010902-003ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH	1.00		**8.20**				8.180	0.24	01/26/2012

Batch R159192 **SampType:** DUP Units RPD Limit 10

SampID: 12010902-004ADUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH	1.00		**8.26**				8.270	0.12	01/26/2012

STANDARD METHODS 18TH ED. 2340 C

Batch R159170 **SampType:** MBLK Units mg/L

SampID: MB-R159170

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Hardness, as (CaCO3)	5		**< 5**						01/25/2012

Batch R159170 **SampType:** LCS Units mg/L

SampID: LCS-R159170

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Hardness, as (CaCO3)	5		**1000**	1000	0	100.0	90	110	01/25/2012

Batch R159170 **SampType:** MS Units mg/L

SampID: 12010902-004BMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Hardness, as (CaCO3)	5		**620**	400	220.0	100.0	85	115	01/25/2012

Batch R159170 **SampType:** MSD Units mg/L RPD Limit 10

SampID: 12010902-004BMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Hardness, as (CaCO3)	5		**600**	400	220.0	95.0	620.0	3.28	01/25/2012

Client: Barr Engineering Company

Work Order: 12010902

Client Project: Rivermines MS-25/86-0009

Report Date: 01-Feb-12

STANDARD METHODS 18TH ED. 2540 D

Batch R159247 **SampType:** MBLK Units mg/L

SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Suspended Solids	6.00		< 6.00						01/27/2012
Total Suspended Solids	6		< 6						01/27/2012

Batch R159247 **SampType:** LCS Units mg/L

SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Suspended Solids	6		90	100	0	90.0	85	115	01/27/2012
Total Suspended Solids	6		96	100	0	96.0	85	115	01/27/2012
Total Suspended Solids	6		108	100	0	108.0	85	115	01/27/2012
Total Suspended Solids	6		100	100	0	100.0	85	115	01/27/2012
Total Suspended Solids	6		105	100	0	105.0	85	115	01/27/2012
Total Suspended Solids	6		98	100	0	98.0	85	115	01/27/2012
Total Suspended Solids	6		96	100	0	96.0	85	115	01/27/2012

Batch R159247 **SampType:** DUP Units mg/L RPD Limit 15

SampID: 12010902-003A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Suspended Solids	6		< 6				0	0.00	01/27/2012

STANDARD METHODS 18TH ED. 5310 C, ORGANIC CARBON

Batch R159214 **SampType:** MBLK Units mg/L

SampID: ICB/MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Organic Carbon (TOC)	1.0		< 1.0						01/26/2012

Batch R159214 **SampType:** LCS Units mg/L

SampID: ICV/LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Organic Carbon (TOC)	5.0		49.0	48.2	0	101.7	89.6	109.5	01/26/2012

EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)

Batch 74624 **SampType:** MBLK Units µg/L

SampID: MB-74624

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2.00		< 2.00	2.00	0	0	-100	100	01/27/2012
Zinc	10.0		< 10.0	10.0	0	0	-100	100	01/26/2012

Batch 74624 **SampType:** LCS Units µg/L

SampID: LCS-74624

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2.00		47.9	50.0	0	95.8	85	115	01/27/2012
Zinc	10.0		436	500	0	87.2	85	115	01/26/2012

Client: Barr Engineering Company
Client Project: Rivermines MS-25/86-0009

Work Order: 12010902
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EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)

Batch 74624 **SampType:** MS Units µg/L
SampID: 12010902-002DMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2.00		**48.2**	50.0	1.1	94.2	75	125	01/27/2012
Zinc	10.0		**1440**	500	966.2	94.2	75	125	01/27/2012

Batch 74624 **SampType:** MSD Units µg/L RPD Limit **20**
SampID: 12010902-002DMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Cadmium	2.00		**47.8**	50.0	1.1	93.4	48.2	0.83	01/27/2012
Zinc	10.0		**1440**	500	966.2	93.8	1437	0.14	01/27/2012

EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)

Batch 74597 **SampType:** MBLK Units µg/L
SampID: MB-74597

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2.00		**< 2.00**	2.00	0	0	-100	100	01/26/2012
Zinc	10.0		**< 10.0**	10.0	0	0	-100	100	01/26/2012

Batch 74597 **SampType:** LCS Units µg/L
SampID: LCS-74597

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2.00		**50.0**	50.0	0	100.0	85	115	01/26/2012
Zinc	10.0		**542**	500	0	108.3	85	115	01/26/2012

Batch 74597 **SampType:** MS Units µg/L
SampID: 12010902-001CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2.00		**63.8**	50.0	17.2	93.2	75	125	01/26/2012
Zinc	10.0	S	**16700**	500	16000	144.0	75	125	01/26/2012

Batch 74597 **SampType:** MSD Units µg/L RPD Limit **20**
SampID: 12010902-001CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Cadmium	2.00		**64.3**	50.0	17.2	94.2	63.8	0.78	01/26/2012
Zinc	10.0		**16400**	500	16000	90.0	16720	1.63	01/26/2012

STANDARD METHODS 18TH ED. 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)

Batch 74611 **SampType:** MBLK Units µg/L
SampID: MB-74611

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	2.00		**< 2.00**	2.00	0	0	-100	100	01/26/2012

Client: Barr Engineering Company

Client Project: Rivermines MS-25/86-0009

Work Order: 12010902

Report Date: 01-Feb-12

STANDARD METHODS 18TH ED. 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)

Batch 74611 **SampType:** LCS Units µg/L

SampID: LCS-74611

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	2.00		**15.5**	15.0	0	103.2	85	115	01/27/2012

Batch 74611 **SampType:** MS Units µg/L

SampID: 12010902-001DMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	2.00		**28.6**	15.0	15.7884	85.2	70	130	01/27/2012

Batch 74611 **SampType:** MSD Units µg/L RPD Limit **20**

SampID: 12010902-001DMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lead	2.00		**29.0**	15.0	15.7884	87.8	28.5659	1.35	01/27/2012

STANDARD METHODS 18TH ED. 3030 E, 3113 B, METALS BY GFAA

Batch 74600 **SampType:** MBLK Units µg/L

SampID: MB-74600

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	2.00		**< 2.00**	2.00	0	0	-100	100	01/26/2012

Batch 74600 **SampType:** LCS Units µg/L

SampID: LCS-74600

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	2.00		**13.0**	15.0	0	86.5	85	115	01/26/2012

Batch 74600 **SampType:** MS Units µg/L

SampID: 12010902-002CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	2.00		**16.3**	15.0	1.5894	98.1	70	130	01/26/2012

Batch 74600 **SampType:** MSD Units µg/L RPD Limit **20**

SampID: 12010902-002CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lead	2.00		**16.0**	15.0	1.5894	96.2	16.2976	1.71	01/26/2012

Teklab, Inc.
Environmental Laboratory

Receiving Check List

http://www.teklabinc.com/

Client: Barr Engineering Company
Client Project: Rivermines MS-25/86-0009

Work Order: 12010902
Report Date: 01-Feb-12

Carrier: Ricky Schmidt

Completed by: Timothy W. Mathis
On: 25-Jan-12

Received By: SRH

Reviewed by: Michael L. Austin
On: 25-Jan-12

Pages to follow: Chain of custody [1] Extra pages included [0]

Shipping container/cooler in good condition?	Yes ☑	No ☐		Not Present ☐		Temp °C	3.2
Type of thermal preservation?	None ☐	Ice ☑		Blue Ice ☐		Dry Ice	☐
Chain of custody present?	Yes ☑	No ☐					
Chain of custody signed when relinquished and received?	Yes ☑	No ☐					
Chain of custody agrees with sample labels?	Yes ☑	No ☐					
Samples in proper container/bottle?	Yes ☑	No ☐					
Sample containers intact?	Yes ☑	No ☐					
Sufficient sample volume for indicated test?	Yes ☑	No ☐					
All samples received within holding time?	Yes ☑	No ☐					
Reported field parameters measured:	Field ☐	Lab ☐		NA ☑			
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐					
When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.							
Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐		No VOA vials ☑			
Water - TOX containers have zero headspace?	Yes ☐	No ☐		No TOX containers ☑			
Water - pH acceptable upon receipt?	Yes ☑	No ☐					

Any No responses must be detailed below or on the COC.

Custody seal intact upon courier pick up. RLS 1/26/12

Print Form

Teklab Chain of Custody

Pg. 1 of 1 Workorder 12010902

5445 Horseshoe Lake Road ~ Collinsville, IL 62234 ~ Phone: (618)344-1004 ~ Fax:(618)344-1005

Barr Engineering Co.

1001 Diamond Ridge, Suite 1100

Jefferson City | MO | 65109

Rivermines MS - 25/86-0009

Are the samples chilled? (•) Yes ( ) No with: (•) Ice ( ) Blue ice Preserved in (•) Lab ( ) Field

Cooler Temp 3.2 Sampler Chris Schulte

Teklab Inc. Courier Pick Up

Comments: Invoice to Mark Nations. Results to Allison Olds and Mark Nations, mnations@doerun.com
Matrix is surface water.
Metals = Cd, Pb, Zn custody seal intact upon pickup RS 1-25-12

Contact Allison Olds eMail aolds@barr.com Phone 573-638-5007 Requested Due Date Standard Billing/PO Per contract with Doe Run

Lab Use	Sample ID	Sample Date/Time	Preservative	Matrix	pH	T.S.S.	Sulfate	Settleable Solids	T.O.C.	Total Metals	Dissolved Metals	Hardness				
12010902 001	RM-001	1-24-12 / 10:30	Unpres 5	Aqueous	☒	☒	☒	☒	☒	☒	☒	☒	☐	☐	☐	☐
002	RM-Dup	13:15	Unpres 5	Aqueous	☒	☒	☒	☐	☒	☒	☒	☒	☐	☐	☐	☐
003	RM-DS	13:00	Unpres 5	Aqueous	☒	☒	☒	☐	☒	☒	☒	☒	☐	☐	☐	☐
004	RM-US	11:05	Unpres 5	Aqueous	☒	☒	☒	☐	☒	☒	☒	☒	☐	☐	☐	☐
			Unpres	Aqueous	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
			Unpres	Aqueous	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
			Unpres	Aqueous	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
			Unpres	Aqueous	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Relinquished By*	Date/Time	Received By	Date/Time
C. Schulte / Barr	1-24-12 / 15:00	R. Slu[illegible]	1-25-12 09:15
R. Slu[illegible]	1-25-12 10:41	Stephen Harms	1-25-12 10:41

* The individual signing this agreement on behalf of client acknowledges that they have read and understand the terms of this agreement and that they have the authority to sign on behalf of client.